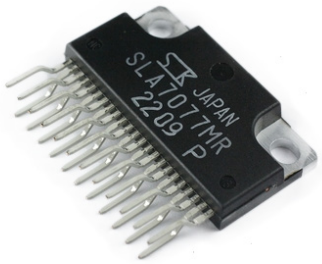

VIDEO INSTRUCTIONS AVAILABLE
Watch the video *De-soldering Motor Chip Driver* by David Martinez at https://youtu.be/J-vUDdL87sU

SHERLINE PRODUCTS
INCORPORATED 1974

Replacing a Motor Driver Chip on the 4-axis CNC Driver Box

P/N 870291

Troubleshooting Stepper Motor Issues

These instructions are for customers who have already gone through the preliminary troubleshooting steps to determine why their stepper motor is malfunctioning.

⚠CAUTION

We recommend that you send your 4-axis CNC driver to us for repairs. These instructions are for our customers who have decided to do their own repairs. Any self-repairs that are done on your 4-axis CNC driver will void the Sherline warranty.

Common Problems

1. The stepper motor does not move at all.
2. The stepper motor moves in one direction only.

Troubleshooting Steps

1. First, we have to find the cause of the problem by narrowing down the possible issues.
2. The number one reason for driver box failure is connecting or disconnecting the stepper motor power cable from the stepper motor or the driver box "With the power on". This will generally blow the fuse for that axis. Check the fuse first following the CNC 4-axis Driver Box instructions (CNC 4-axis Driver Box, 8760)
3. The second cause of failure is a broken stepper motor. These wires are very small. With the power off, look at the wires going into the stepper motor connector wire. Look for any black burn marks. Look at each wire closely. (see Figure 1).

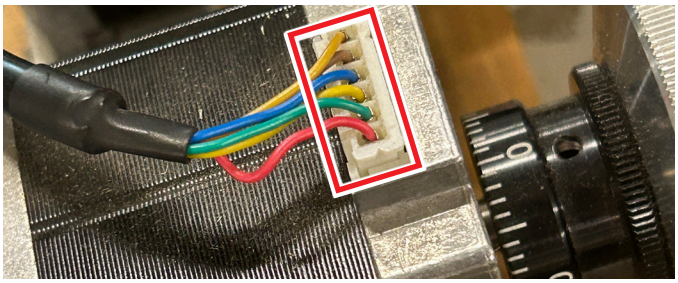

FIGURE 1—Close-up of the stepper motor wire connector.

4. The next reason is a bad stepper motor power cable. With the power off, swap the power cable from a good stepper motor to the bad stepper motor. Then, plug the power cable from the bad stepper motor into the good stepper motor. Now power up and jog each axis in both directions.
   A. If the bad stepper motor works now, then the stepper motor is good, and the problem is either the cable or the driver board.
   B. If the good stepper motor is now having the same problems as the bad stepper motor, again, it is either the cable or the driver board.
   C. With the power off, open the driver box. We are going to switch the stepper motor power cables. When we assemble the driver box, we use clear silicon to secure each power cable to the driver box outlet (see Figure 2).

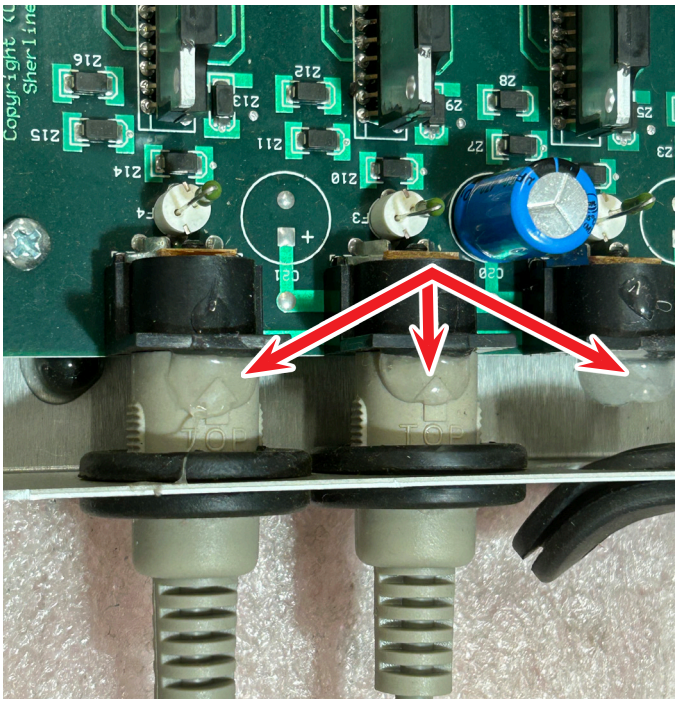

FIGURE 2—The red arrows show the clear silicone used to secure the power cables to the driver box.

We do this to keep the cable from pulling out of the driver board. With a marker, mark the cable that was attached to the bad stepper motor so you don't get them mixed up. You will need to cut the silicone with a hobby knife (or razor blade). Then, pull the power cable for the bad stepper motor and the good stepper motor from the board outlet. Plug the bad stepper motor cable into the good driver board axis. Then, connect the bad cable to the good stepper motor. Now power up again and jog the axis in both directions. If the stepper motor jogs in both directions, then the cable is good. If not, the cable is bad, and you will need to replace it. If the cable is good, this means that the problem is with the driver board. If you need to replace the driver board, please see the following section on **Replacing the Motor Driver Chip**.

5. Check your 25-pin parallel port connection at the driver box port and at the control port to be sure that it is inserted all of the way into the port (see Figure 3).

FIGURE 3

6. Another cause of stepper motor malfunction is if one or more of the pins in the male 25 DP connector (parallel port connector) get bent or broken and do not make complete contact with the pinhole in the female connector. Check the pins inside the male connector to see if any of them have been bent and are not going into the female connector correctly (see Figure 4).

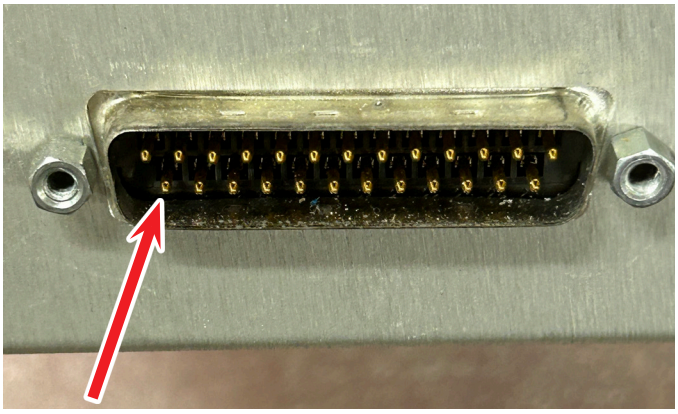

FIGURE 4— Look closely at the pins in the male connector for any damaged pins.

Replacing the Motor Drive Chip

If you have gone through the previous troubleshooting steps and have determined that the issue is with the driver board, use the following steps in replacing one, or more, of a motor driver chip.

Materials Needed

- 1 De-soldering Gun
- 1 Soldering station
- Solder
- Flux (Chipquick NC191-30CC)
- Isopropyl Alcohol

Steps for Replacing the Motor Drive Chip

1. Apply flux over the soldering points on the back of the circuit board.

FIGURE 5—The red rectangle shows one of the four chip solder points.

2. Use a de-soldering gun to remove the solder points.

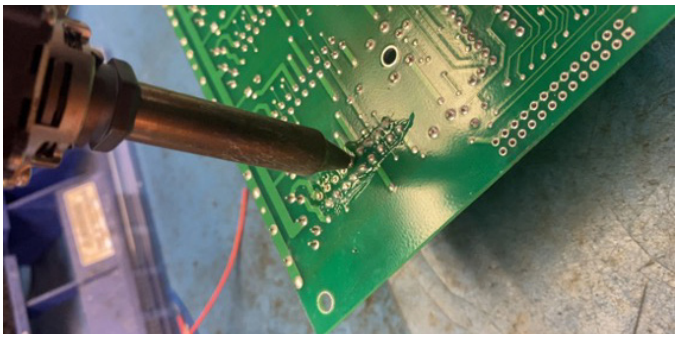

FIGURE 6

3. With the soldering tip, make sure that all the pins are free from the circuit board.

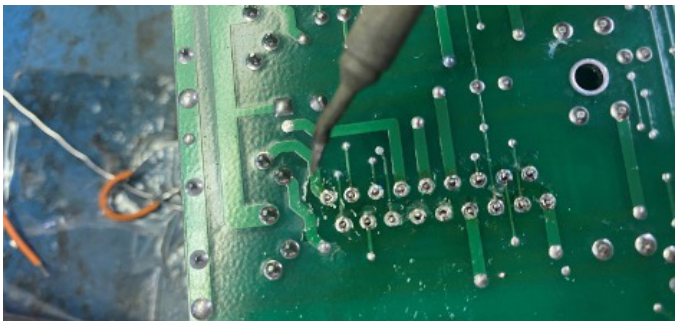

FIGURE 7

4. Remove the Motor Driver Chip.

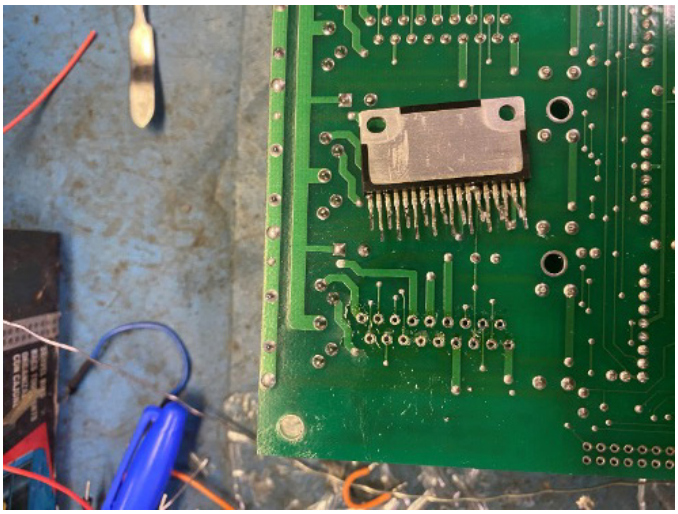

FIGURE 8—The Motor Driver Chip removed from the front side of the circuit board.

5. Clean both sides of the circuit board with Isopropyl Alcohol.

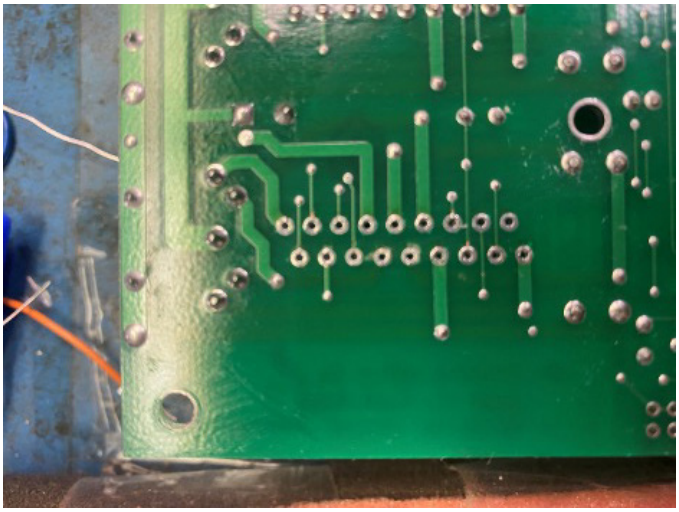

FIGURE 9

6. Apply fresh Flux on both sides of the Motor Driver Chip holes (see Figures 10 and 11).

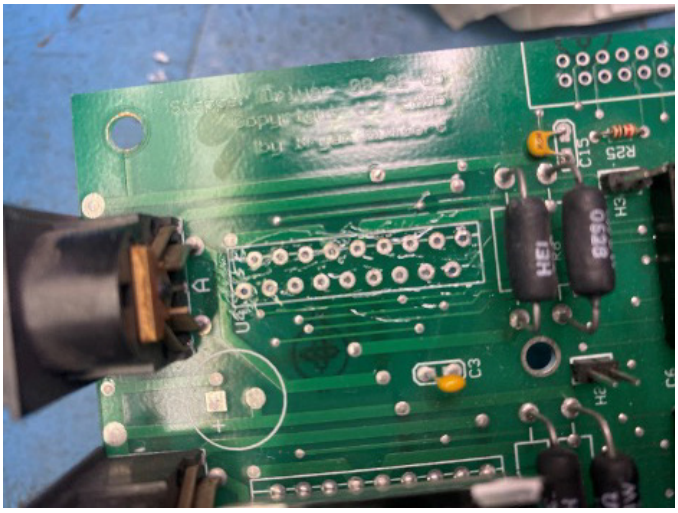

FIGURE 10—Front side of the circuit board.

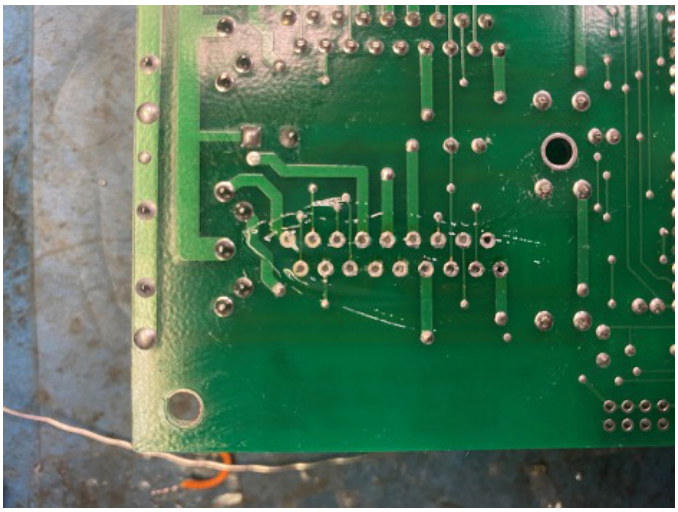

FIGURE 11—Back side of the circuit board.

7. Put the new driver chip in using the soldering station (see Figures 12 and 13).

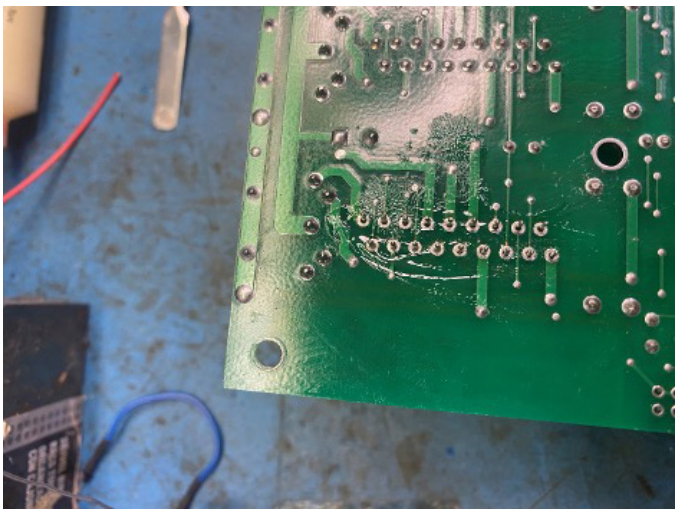

FIGURE 12

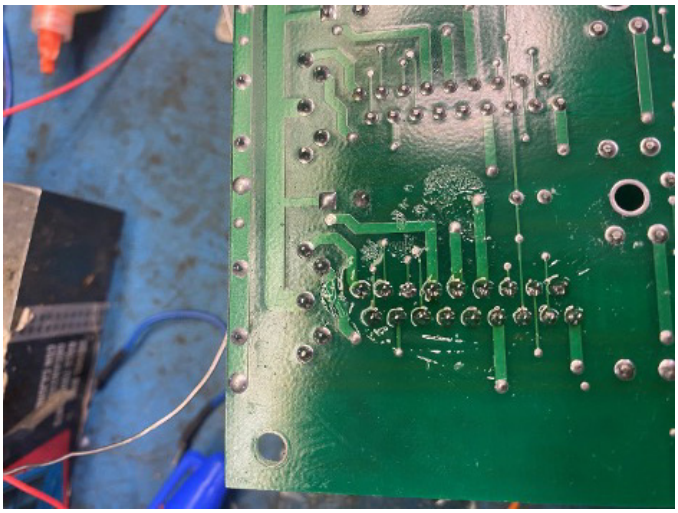

FIGURE 13

8. Make sure that the solder reaches the other side of the board for good contact.

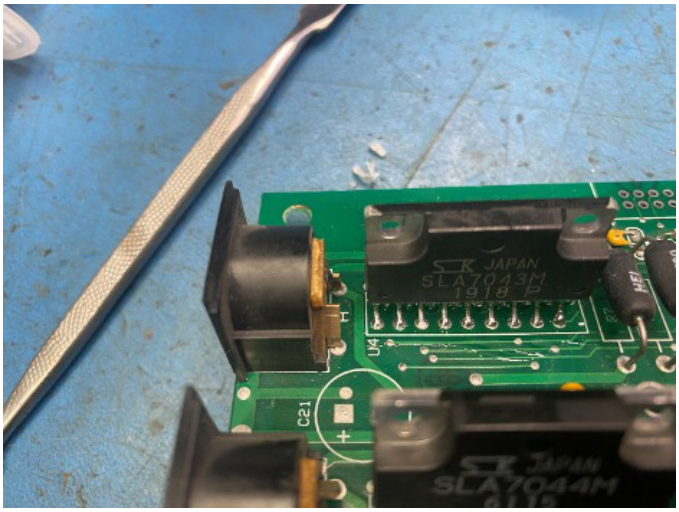

FIGURE 14

9. Cut the pins and clean both sides with Isopropyl Alcohol.

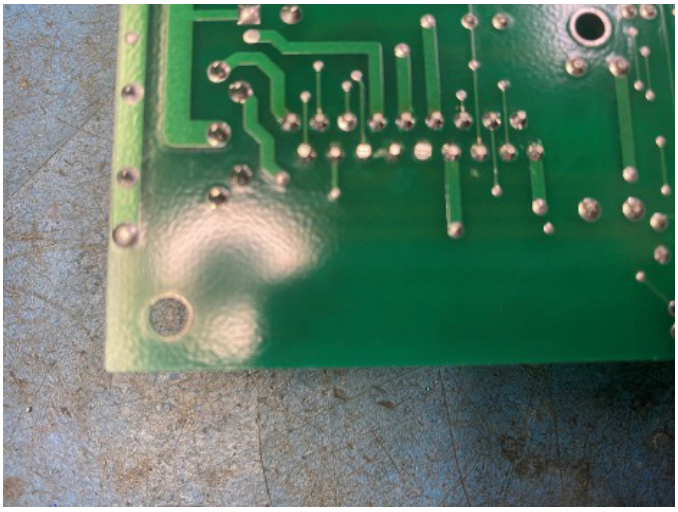

FIGURE 15

10. The motor driver chip was replaced.

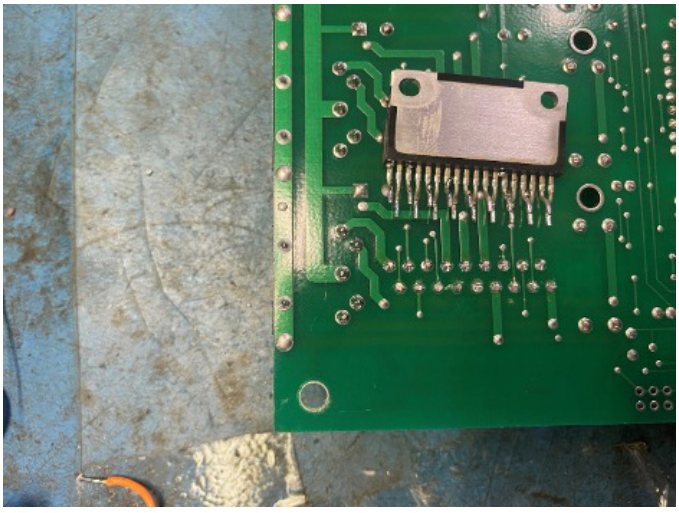

FIGURE 16

11. Another possible problem is that one or more diodes may be bad. Check for burn marks around the diodes and see if they look like they may have blown (see Figure 17).

    To replace the diodes, use the method shown for the Motor Drive Chip.

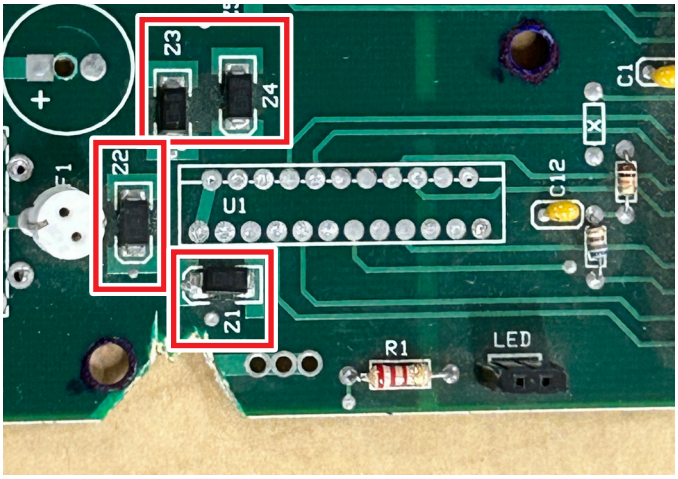

FIGURE 17

Replacement Parts

- CNC Program Chip (P/N 87058)
- Diode (P/N 87093)

Thank you,
Sherline Products Inc.